

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS

1. (Previously presented) A method of modulating a source data to be written onto an optical recording medium under the conditions of a given code rate and limited run length, comprising the steps of:

(a) modulating the source data based on a first mapping table and modulating the same source data based on a second mapping table, the first mapping table containing coded data corresponding to the source data, the second mapping table containing at least one coded data, capable of suppressing low frequency components, which at least one source data among all source data contained in the first mapping table is mapped to, wherein the first mapping table includes a 2/3 sub-table containing 3-bit coded data for 2-bit source data, a 4/6 sub-table containing 6-bit coded data for 4-bit source data, a 6/9 sub-table containing 9-bit coded data for 6-bit source data, and a 8/12 sub-table containing 12-bit coded data for 8-bit source data; and

(b) selecting one of the modulated data based on at least one condition among the conditions of: the value of a previous source data, the time when low-frequency suppression has been conducted, the value of subsequent modulated data, and whether or not RLL constraints are violated.

2. (Previously presented) The method set forth in claim 1, wherein said step (b) comprises the steps of:

calculating each digital sum value of the modulated data;

choosing one of the two data modulated according to the first and the second mapping tables in response to a control signal for suppressing low-frequency components;

converting the chosen modulated data to channel data matching the optical recording medium; and

recording the channel data onto the optical recording medium.

3. (Original) The method set forth in claim 2, wherein the channel data has the run length ranging from 1 to 8.

4. (Previously presented) The method set forth in claim 1, wherein the first mapping table further includes a 10/15 sub-table containing 15-bit coded data for 10-bit source data.

5. (Previously presented) The method set forth in claim 1, wherein the second mapping table is composed of a 2/3 low-frequency suppressing sub-table in which at least one 3-bit low-frequency suppressing coded data is contained for at least one source data among all the source data contained in the 2/3 sub-table, and a 4/6 low-frequency suppressing sub-table in which at least one 6-bit low-frequency suppressing coded data is contained for at least one source data among all the source data contained in the 4/6 sub-table.

6. (Previously presented) The method set forth in claim 1, further comprising the step of modulating a current source data using the first mapping table if the source data is modulated right before using one of the 6/9 sub-table and the 8/12 sub-table.

7. (Previously presented) A method of demodulating a channel data written onto an optical recording medium, comprising the steps of:

(a) reading a channel data from the optical recording medium, the channel data having been modulated from a source data using a table selected among a plurality of mapping tables based on at least one condition among the conditions of: the value of a previous source data, the time when low-frequency suppression

has been conducted, the value of subsequent modulated data, and whether or not RLL constraints are violated; and

(b) demodulating the read channel data using a plurality of de-mapping tables in which a decoded data corresponding to the channel data is contained, wherein the de-mapping tables include a $3/2$ sub-table containing 2-bit source data for 3-bit coded data, a $6/4$ sub-table containing 4-bit source data for 6-bit coded data, a $9/6$ sub-table containing 6-bit source data for 9-bit coded data, and a $12/8$ sub-table containing 8-bit source data for 12-bit coded data.

8. (Previously presented) An apparatus of modulating a source data to be written onto an optical recording medium under the conditions of a given code rate and limited run length, comprising:

a modulator modulating the source data based on a first mapping table and modulating the same source data based on a second mapping table, the first mapping table containing coded data corresponding to the source data, the second mapping table containing at least one coded data, capable of suppressing low frequency components, which at least one source data among all source data contained in the first mapping table is mapped to, wherein the first mapping table includes a $2/3$ sub-table containing 3-bit coded data for 2-bit source data, a $4/6$ sub-table containing 6-bit coded data for 4-bit source data, a $6/9$ sub-table containing 9-bit coded data for 6-bit source data, and a $8/12$ sub-table containing 12-bit coded data for 8-bit source data; and

a controller selecting one of the modulated data based on at least one condition among the conditions of: the value of the source data, the time when low-frequency suppression has been conducted, the value of subsequent modulated data, and whether or not RLL constraints are violated.

9. (Previously presented) The apparatus set forth in claim 8, further comprising:

a pattern detecting/low-frequency suppressing control signal generating unit generating a pattern match signal indicating a mapping table for a given source data to control said modulator, and generating a low-frequency suppressing control signal to control said controller, the low-frequency suppressing control signal being indicative of the time when a low-frequency suppressing control is conducted.

10. (Previously presented) The apparatus set forth in claim 9, wherein said controller comprises:

a calculator each digital sum value of the modulated data;

a selector choosing one of the two data modulated according to the first and the second mapping tables in response to a control signal for suppressing low-frequency components;

a converter converting the chosen modulated data to channel data matching the optical recording medium; and

a writing unit recording the channel data onto the optical recording medium.

11. (Original) The apparatus set forth in claim 10, wherein the channel data has the run length ranging from 1 to 8.

12. (Previously presented) The apparatus set forth in claim 8, wherein the first mapping table further includes a 10/15 sub-table containing 15-bit coded data for 10-bit source data.

13. (Previously presented) The apparatus set forth in claim 8, wherein the second mapping table is composed of a 2/3 low-frequency suppressing sub-table in which at least one 3-bit low-frequency suppressing coded data is contained for at least one source data among all the source data contained in the 2/3 sub-table, and a 4/6 low-frequency suppressing sub-table in which at least one 6-bit

low-frequency suppressing coded data is contained for at least one source data among all the source data contained in the 4/6 sub-table.

14. (Previously presented) An apparatus of demodulating a channel data written onto an optical recording medium, comprising:

a detector reading a channel data from the optical recording medium, the channel data having been modulated from a source data using a table selected among a plurality of mapping tables; and

a demodulator demodulating the read channel data using a plurality of de-mapping tables in which a decoded data corresponding to the channel data is contained, wherein the de-mapping tables include a 3/2 sub-table containing 2-bit source data for 3-bit coded data, a 6/4 sub-table containing 4-bit source data for 6-bit coded data, a 9/6 sub-table containing 6-bit source data for 9-bit coded data, and a 12/8 sub-table containing 8-bit source data for 12-bit coded data.

15. (Currently Amended) A method of modulating a source data to be written onto an optical recording medium under the conditions of a given code rate and limited run length, comprising the steps of:

(a) modulating the source data to a coded data based on at least one mapping table, the mapping table including a ~~first table and a second table containing coded data corresponding to the source data, the first table being a 2/3 table containing 3-bit coded data for 2-bit source data, and the second table being a 4/6 table containing 6-bit coded data for 4-bit source data, a third table being a 6/9 table containing 9-bit coded data for 6-bit source data, and an 8/12 table containing 12-bit coded data for 8-bit source data~~, wherein one of the ~~first table and the second table~~ tables is selected according to a bit sequence of the source data; and

(b) recording the coded data onto the optical recording medium.

16. (Previously presented) The method set forth in claim 15, wherein the given code rate is $2/3$, and the step (a) modulates the source data to a coded data on the basis of the given code rate.

17. (Previously presented) The method set forth in claim 16, wherein the coded data has the run length limited (RLL) (1,k) constraints, where k is an integer number greater than 1.

18. (Previously presented) The method set forth in claim 17, wherein the modulated data has no merging bit to suppress a DC component.

19. (Canceled).

20. (Previously presented) The method set forth in claim 15, wherein in the step (a), the mapping table further includes a $2/3$ low-frequency suppressing sub-table in which at least one 3-bit low-frequency suppressing coded data is contained for at least one source data among all the source data contained in the $2/3$ table.

21. (Currently Amended) The method set forth in claim ~~49~~ 15, wherein the step (a) modulates a current source data using the ~~first~~ $2/3$ table if the source data is modulated right before using one of the $6/9$ table and the $8/12$ table.

22. (Previously presented) The method set forth in claim 15, wherein in the step (a), the mapping table further includes a $4/6$ low-frequency suppressing sub-table in which at least one 6-bit low-frequency suppressing coded data is contained for at least one source data among all the source data contained in the $4/6$ table.

23. (Previously presented) The method set forth in claim 15, wherein in the step (b), the coded data is converted into channel data and then recorded onto the optical recording medium.

24. (Currently Amended) A method of demodulating a coded data written onto an optical recording medium, comprising the steps of:

(a) reading a coded data from the optical recording medium, the coded data having been modulated from a source data using a table selected among a plurality of mapping tables based on at least a bit sequence of the source data; and

(b) demodulating the read coded data using a plurality of de-mapping tables, wherein the de-mapping tables ~~include a first table being~~ includes a 3/2 sub-table ~~table~~ containing 2-bit source data for 3-bit coded data, and a second table being a 6/4 sub-table ~~table~~ containing 4-bit source data for 6-bit coded data, a third table being a 9/6 table containing 6-bit source data for 9-bit coded data, and a 12/8 table containing 8-bit source data for 12-bit coded data.

25. (Previously presented) The method set forth in claim 24, wherein the coded data has been modulated to a given code rate being $2/3$.

26. (Previously presented) The method set forth in claim 25, wherein the modulated data has no merging bit to suppress a DC component.

27. (Previously presented) The method set forth in claim 24, wherein the coded data has a run length limited (RLL) (1,k) constraints, where k is an integer number greater than 1.

28. (Canceled).